

WHAT IS CLAIMED IS:

1. A pellicle for a photolithographic patterning process by means of a light having a wavelength of from 100 to 200 nm, which has a pellicle membrane made of the following fluoropolymer (A):

Fluoropolymer (A): a substantially linear fluoropolymer which has an alicyclic structure in its main chain, the main chain being a chain of carbon atoms, and which satisfies the following requirements (1) and (2):

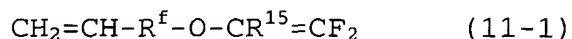
(1) the carbon atoms in the main chain comprise a carbon atom having at least one hydrogen atom bonded thereto and a carbon atom having no hydrogen atom bonded thereto; and

(2) in the measurement of its high resolution proton magnetic resonance spectrum, the number of hydrogen atoms based on signals appearing on the higher magnetic field side than 2.8 ppm, is at most 6 mol% based on the total hydrogen atoms.

2. The pellicle according to Claim 1, wherein the fluoropolymer (A) is a fluoropolymer which has substantially no signals appearing on the higher magnetic field side than 2.8 ppm in the measurement of its high resolution proton magnetic resonance spectrum.

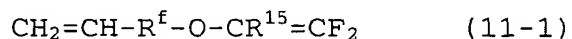
3. The pellicle according to Claim 1, wherein the fluoropolymer (A) contains monomer units formed by cyclopolymerization of a diene monomer represented by the

following formula (11-1):



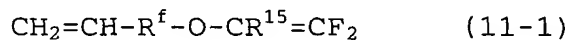
wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

- 5 4. The pellicle according to Claim 2, wherein the fluoropolymer (A) contains monomer units formed by cyclopolymerization of a diene monomer represented by the following formula (11-1):



- 10 wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

5. The pellicle according to Claim 1, wherein the fluoropolymer (A) is a fluoropolymer obtained by cyclopolymerization of a diene monomer represented by the following formula (11-1), or a fluoropolymer obtained by  
15 copolymerizing a diene monomer represented by the following formula (11-1) with at least one monoene monomer having no or one hydrogen atom-bonded carbon atom, as a carbon atom of a polymerizable unsaturated group  
20 (provided that the polymerization of the diene monomer is cyclic polymerization):



wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

- 25 6. The pellicle according to Claim 5, wherein the fluoropolymer (A) is a fluoropolymer obtained by carrying out the polymerization at a temperature of at most  $15^\circ\text{C}$ .

7. The pellicle according to Claim 1, wherein the fluoropolymer (A) is a fluoropolymer (A) obtained by fluorinating a fluoropolymer having the same structure as the fluoropolymer (A) except that it does not satisfy the requirement (2), to have some of hydrogen atoms bonded to carbon atoms substituted by fluorine atoms.

8. A pellicle for a photolithographic patterning process by means of a light having a wavelength of from 100 to 200 nm, which comprises a pellicle membrane, a frame supporting the pellicle membrane, and an adhesive bonding the pellicle membrane to the frame, wherein the adhesive is made of the following fluoropolymer (A):

Fluoropolymer (A): a substantially linear fluoropolymer which has an alicyclic structure in its main chain, the main chain being a chain of carbon atoms, and which satisfies the following requirements (1) and (2):

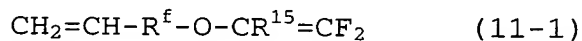
(1) the carbon atoms in the main chain comprise a carbon atom having at least one hydrogen atom bonded thereto and a carbon atom having no hydrogen atom bonded thereto; and

(2) in the measurement of its high resolution proton magnetic resonance spectrum, the number of hydrogen atoms based on signals appearing on the higher magnetic field side than 2.8 ppm, is at most 6 mol% based on the total hydrogen atoms.

9. The pellicle according to Claim 8, wherein the

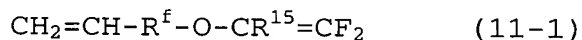
fluoropolymer (A) is a fluoropolymer which has substantially no signals appearing on the higher magnetic field side than 2.8 ppm in the measurement of its high resolution proton magnetic resonance spectrum.

- 5 10. The pellicle according to Claim 8, wherein the fluoropolymer (A) contains monomer units formed by cyclopolymerization of a diene monomer represented by the following formula (11-1):



- 10 wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^{\text{f}}$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

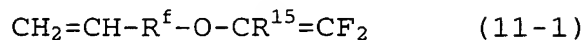
11. The pellicle according to Claim 9, wherein the fluoropolymer (A) contains monomer units formed by cyclopolymerization of a diene monomer represented by the  
15 following formula (11-1):



wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^{\text{f}}$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

12. The pellicle according to Claim 8, wherein the  
20 fluoropolymer (A) is a fluoropolymer obtained by cyclopolymerization of a diene monomer represented by the following formula (11-1), or a fluoropolymer obtained by copolymerizing a diene monomer represented by the following formula (11-1) with at least one monoene  
25 monomer having no or one hydrogen atom-bonded carbon atom, as a carbon atom of a polymerizable unsaturated group (provided that the polymerization of the diene monomer is

cyclic polymerization):



wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

5 13. The pellicle according to Claim 12, wherein the fluoropolymer (A) is a fluoropolymer obtained by carrying out the polymerization at a temperature of at most  $15^\circ\text{C}$ .

14. The pellicle according to Claim 8, wherein the fluoropolymer (A) is a fluoropolymer (A) obtained by  
10 fluorinating a fluoropolymer having the same structure as the fluoropolymer (A) except that it does not satisfy the requirement (2), to have some of hydrogen atoms bonded to carbon atoms substituted by fluorine atoms.

15. A pellicle for a photolithographic patterning process  
15 by means of a light having a wavelength of from 100 to 200 nm, which comprises a pellicle membrane, a frame supporting the pellicle membrane, and an adhesive bonding the pellicle membrane to the frame, wherein the pellicle membrane and the adhesive are made of the following

20 fluoropolymer (A):

Fluoropolymer (A): a substantially linear fluoropolymer which has an alicyclic structure in its main chain, the main chain being a chain of carbon atoms, and which satisfies the following requirements (1) and

25 (2):

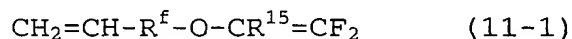
(1) the carbon atoms in the main chain comprise a carbon atom having at least one hydrogen atom bonded

thereto and a carbon atom having no hydrogen atom bonded thereto; and

(2) in the measurement of its high resolution proton magnetic resonance spectrum, the number of hydrogen atoms based on signals appearing on the higher magnetic field side than 2.8 ppm, is at most 6 mol% based on the total hydrogen atoms.

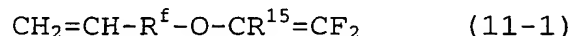
16. The pellicle according to Claim 15, wherein the fluoropolymer (A) is a fluoropolymer which has substantially no signals appearing on the higher magnetic field side than 2.8 ppm in the measurement of its high resolution proton magnetic resonance spectrum.

17. The pellicle according to Claim 15, wherein the fluoropolymer (A) contains monomer units formed by cyclopolymerization of a diene monomer represented by the following formula (11-1):



wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

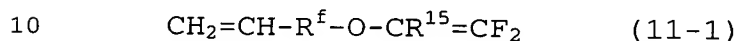
18. The pellicle according to Claim 16, wherein the fluoropolymer (A) contains monomer units formed by cyclopolymerization of a diene monomer represented by the following formula (11-1):



wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group, and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

19. The pellicle according to Claim 15, wherein the

fluoropolymer (A) is a fluoropolymer obtained by  
cyclopolymerization of a diene monomer represented by the  
following formula (11-1), or a fluoropolymer obtained by  
copolymerizing a diene monomer represented by the  
5 following formula (11-1) with at least one monoene  
monomer having no or one hydrogen atom-bonded carbon atom,  
as a carbon atom of a polymerizable unsaturated group  
(provided that the polymerization of the diene monomer is  
cyclic polymerization):



wherein  $\text{R}^{15}$  is a fluorine atom or a trifluoromethyl group,  
and  $\text{R}^f$  is a  $\text{C}_{1-4}$  perfluoroalkylene group.

20. The pellicle according to Claim 19, wherein the  
fluoropolymer (A) is a fluoropolymer obtained by carrying  
15 out the polymerization at a temperature of at most  $15^\circ\text{C}$ .

21. The pellicle according to Claim 15, wherein the  
fluoropolymer (A) is a fluoropolymer (A) obtained by  
fluorinating a fluoropolymer having the same structure as  
the fluoropolymer (A) except that it does not satisfy the  
20 requirement (2), to have some of hydrogen atoms bonded to  
carbon atoms substituted by fluorine atoms.